

Y10 Mathematics Knowledge Organiser

FOUNDATION PART 1: Brackets, Number

Key Language

1	expression	A combination of numbers or letters e.g. $5h$, $3a + 9b^2$ (An expression does not include an = symbol)
2	quadratic expression	An expression with positive powers where the highest power is 2 e.g. $x^2 + 6x + 9$
3	term	One part of an expression, separated by + or – e.g. in the expression $5a - 2b + 7$ the terms are $5a$, $-2b$ and 7
4	expand or multiply out	Remove the brackets from an expression
5	perfect square	A bracket which is squared e.g. $(k + 5)^2$
6	difference of two squares	An expression with one ‘square’ term subtracted from another e.g. $4x^2 - 49$, $a^2 - b^2$ This type of expression can be written as a double bracket where each is identical except for the sign e.g. $(x + 4)(x - 4)$
7	equation	A statement in algebra, including the = symbol, which is only true for certain values of the unknown e.g. $5x + 3 = 23$ is true when $x = 4$
8	factorise	Put into brackets (by taking out a common factor)
9	index plural: indices	Power
10	base	The ‘large’ number in a power e.g. for 5^4 the base is 5
11	reciprocal	1 divided by the number
12	standard form	A way of writing very large or very small numbers without needing to write lots of zeros
13	prime number	A number with <i>exactly two factors</i> (1 and itself)
14	product	The result of <i>multiplying</i> two numbers
15	highest common factor (HCF)	The highest common factor of two numbers is the largest number that is a factor of both of them
16	lowest common multiple (LCM)	The lowest common multiple of two numbers is the smallest number that is a multiple of both of them

Standard Form

e.g. 9×10^{-6} (Note that $1 \leq 9 < 10$)

Know

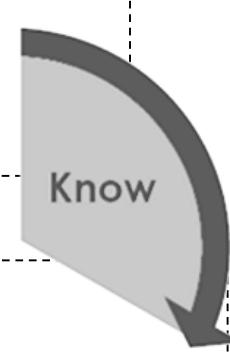


Prime Numbers

You should learn the prime numbers less than 20.

These are:

2, 3, 5, 7, 11, 13, 17, 19



Know

Roots

Square root: $\sqrt{25} = 5$ (because $5^2 = 25$)

Cube root: $\sqrt[3]{125} = 5$ (because $5^3 = 125$)

Higher roots: e.g. $\sqrt[4]{625} = 5$ (because $5^4 = 625$)

Prime Factor Form

Every number above 1 that isn't prime can be written in only one way as a multiplying calculation involving only prime numbers.

e.g. $\boxed{450} = \boxed{\text{FACT}} 2 \times 3 \times 3 \times 5 \times 5 = 2^2 \times 3^2 \times 5$

The $\boxed{\text{FACT}}$ function on a modern scientific calculator can be used to find the prime factor form for a number.

Revision: Fractions, Decimals and Percentages

Make sure you know these conversions for simple fractions, decimals and percentages

PRACTICE QUESTIONS

Fraction	Decimal	Percentage
$\frac{1}{2}$	0.5	50%
$\frac{1}{4}$	0.25	25%
$\frac{1}{3}$	0.333333..... 0. $\dot{3}$	33. $\dot{3}$ %
$\frac{3}{4}$	0.75	75%
$\frac{1}{5}$	0.2	20%

Ten of these questions will be chosen, with very little change, to make the Knowledge Test. If you can confidently answer all of these, you will pass easily.

Use pages 1 and 2 to research and *learn* anything that you don't know yet.

- Which of these is an *expression*? A: $5x + 7$ B: $2x + 9 = 17$ C: $V = IR$
- Which of these is an *equation*? A: $2p + 3q$ B: $5p + 3 = 10$ C: $10p - 17$
- Which of these is a *perfect square*? A: $(x + 3)^2$ B: $x^2 + 25$ C: $x^2 - 49$
- Which is a *difference of two squares*? A: $(x + 3)^2$ B: $x^2 + 25$ C: $x^2 - 49$
- When expanded, $(x + 5)(x - 5)$ would give a special type of expression. What type?
- What special name do we give to expressions like $(x + 5)^2$ or $(x + 5)(x + 5)$?
- What does the word *factorise* mean?



Do

PRACTICE QUESTIONS (continued)

8. Which of these expressions is *quadratic*? A: $x^2 + x^{-1}$ B: $3x - x^2$ C: $x^3 + x^2$
9. What word means '1 divided by a number'?
10. What does the word *product* mean?
11. What is the *product* of 4 and 5?
12. How many factors does a *prime number* have?
13. Which of these is **not** a prime number: 2, 5, 9, 11, 17
14. Which of these is **not** a prime number: 1, 2, 7, 13, 19
15. Which of these sets of numbers is in *prime factor form*?
A: $2 \times 3 \times 5$ B: 2, 3, 5 C: $2 + 3 + 5$
16. What function on a scientific calculator gives you a number in *prime factor form*?
17. Write down the value of $\sqrt{9}$
18. Write down the value of $\sqrt[3]{8}$
19. Which of these shows a *square root*? A: $\sqrt{64}$ B: 64^2 C: $\sqrt[3]{64}$
20. Which of these shows a *cube root*? A: $\sqrt{64}$ B: 64^2 C: $\sqrt[3]{64}$
21. What is $\frac{3}{4}$ as a percentage?
22. What is the decimal equivalent of 25%?
23. What simplified fraction is equivalent to the decimal $0.\dot{3}$?
24. What is $\frac{1}{5}$ as a decimal?

NOTE: Questions like Q21-24 could use any of the conversions
in the table on page 2.

ANSWERS

- | | |
|---|-----------------------|
| 1. A: $5x + 7$ | 2. B: $5p + 3 = 10$ |
| 3. A: $(x + 3)^2$ | 4. C: $x^2 - 49$ |
| 5. A <i>difference of two squares</i> | |
| 6. A <i>perfect square</i> | |
| 7. <i>Factorise</i> means 'put into brackets' (by taking out a common factor) | |
| 8. B: $3x - x^2$ | 9. <i>reciprocal</i> |
| 10. multiply | 11. 20 |
| 12. A prime number has exactly two factors | |
| 13. 9 is not a prime number (see the list to learn on page 1) | |
| 14. 1 is not a prime number (see the list to learn on page 1) | |
| 15. A: $2 \times 3 \times 5$ | |
| 16. The FACT function | |
| 17. 3 (because $3^2 = 3 \times 3 = 9$) | |
| 18. 2 (because $2^3 = 2 \times 2 \times 2 = 8$) | |
| 19. A: $\sqrt{64}$ | 20. C: $\sqrt[3]{64}$ |
| 21. 75% | 22. 0.25 |
| 23. $\frac{1}{3}$ | 24. 0.2 |

